Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Dardenne Creek

Waterbody Segment at a Glance:

Counties:	Warren St. Charles
Nearby Cities:	New Melle, Cottleville, St. Peters and St. Charles
Length of Impairment:	10 miles
Pollutants:	Habitat Loss
Pollutant Sources:	Urban and Rural Nonpoint Sources


State map showing location of watershed

Proposed for addition to the 2002 303(d) list

TMDL Priority Ranking: To be determined

Description of the Problem

Beneficial uses of Dardenne Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Boating and Canoeing

Standards that apply

- All waterbodies in Missouri are protected by the *general* criteria (standards) contained in Missouri's Water Quality Standards (WQS), 10 CSR20-7.031(3). These criteria (also called *narrative* criteria) list substances that all waters "shall be free from". For example, points (3)(A), (C) and (G)state:
  - Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
  - Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.
  - Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community.

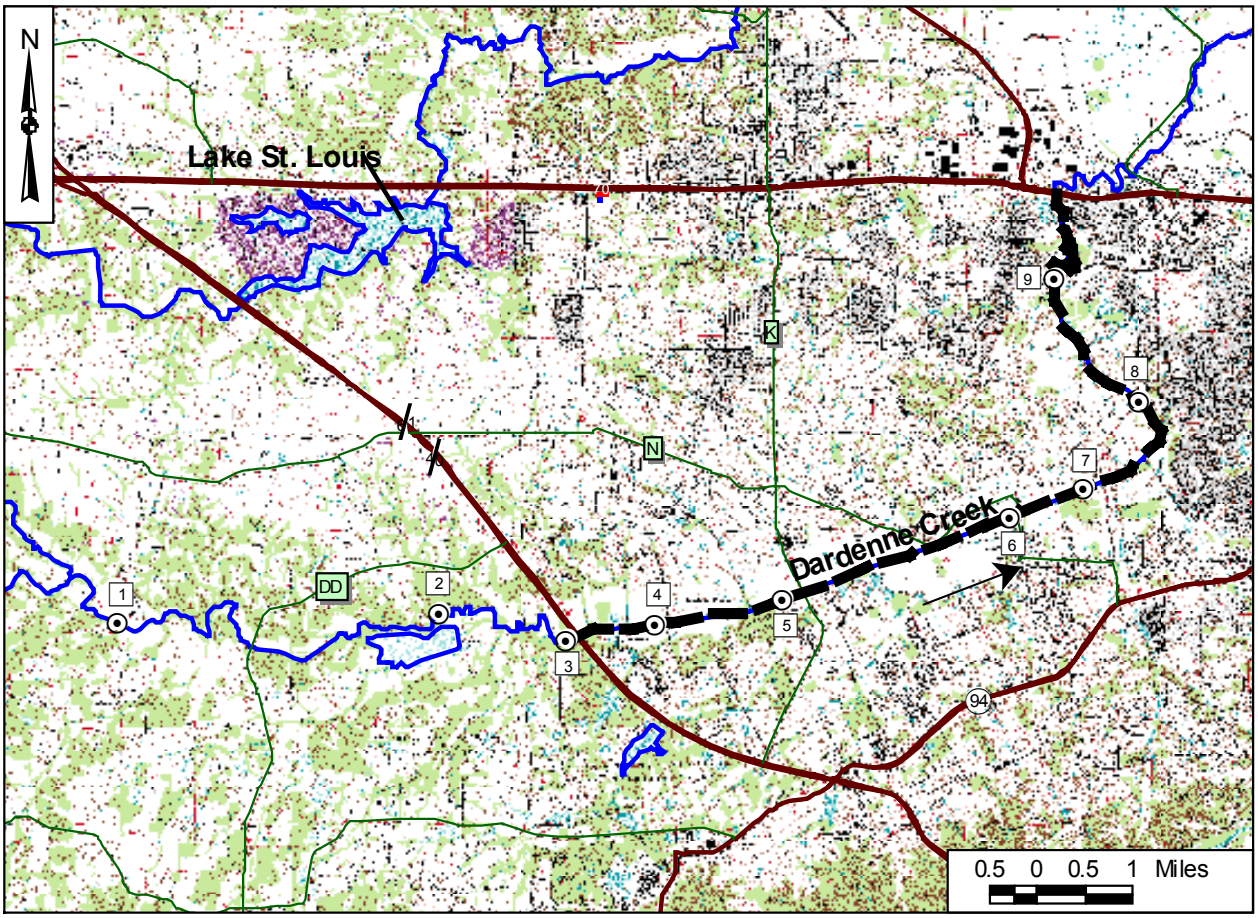
Aquatic Invertebrate sampling by the Department of Natural Resources indicates poor water quality and/or poor aquatic habitat conditions in Dardenne Creek downstream of highways 40 and 61. The Dardenne Creek watershed contains a significant number of potential pollution sources. These include sewage treatment plants and stormwater runoff from quarries, development and residential lawns. Any of these sources could cause the observed impact on the aquatic invertebrate (creatures like crayfish and water insects) community. Dardenne Creek is classified as a Metropolitan No-Discharge Stream

from Route DD to Interstate 70 (see map below). This means no new discharges can be allowed that would degrade the water quality in the creek (WQS 10 CSR20-7.031(6)).

Over the last several years, Missouri Volunteer Quality Monitoring monitors have been collecting data at nine sites along Dardenne Creek (see map below). In an effort to better understand the stream, the last three years of available volunteer data have been compiled and summarized (see table below). Volunteers sampled the creek for temperature (C°), dissolved oxygen (DO), biological oxygen demand (BOD), nitrates (NO_3), ammonia (NH_3), phosphate (PO_4), specific conductance (SC), total solids (TS), total dissolved solids (TDS), turbidity (TURB), pH, and fecal coliform (FC). Missouri Water Quality Monitoring Volunteer Macroinvertebrate Water Quality Ratings (WQRate) were also included and are an indication of the diversity of macroinvertebrates present. The results of this sampling are discussed below.

More monitoring by the department is scheduled for the spring and summer of 2002. This includes a 48-hour Waste Load Allocation study, stormwater sampling (chemistry) and aquatic invertebrate monitoring. Also, the Missouri Department of Conservation is conducting a sediment study on Dardenne Creek that started in April 2002.

Dardenne Creek with Sampling Sites, Warren and St. Charles Counties, Missouri



Dardenne Creek: Water Quality Data Averages

Location	WQRate	Temp	DO	BOD	NO_3	NH_3	PO_4	SC	TS	TDS	TURB	pH*	FC**
		C	mg/l	mg/l	mg/l	mg/l	Mg/l	us	mg/l	mg/l	NTU	su	cfu
1. Hopewell Road	**26**							**469**	**802.9**	**176**	**8.8**		
2. Busch Conservation Area		**8.3**	**8.4**	**4.5**	**0.36**	**0.52**	**0.49**	**337**			**37.2**	**7.2**	**99**
3. Highway 40	**21**	**9.2**	**8.7**	**3.0**	**0.34**	**0.65**	**0.79**	**406**	**358.0**		**8.9**	**7.7**	**84**
4. Henning Road		**12.8**	**9.8**	**1.5**	**0.14**	**0.57**	**0.86**	**390**			**10.8**	**7.6**	**33**
5. Highway K		**9.3**	**7.0**	**3.0**	**1.79**	**0.75**	**0.29**	**630**	**270.6**	**242**	**22.5**	**7.7**	**203**
6. Highway N		**11.1**	**7.4**	**6.8**	**0.72**	**0.79**	**1.07**	**448**	**1108.0**		**22.7**	**7.5**	**20**
7. Upstream of Mid-Rivers Mall	**18.5**	**9.4**	**9.8**	**7.0**	**0.30**	**0.38**	**0.50**	**362**	**24.0**		**37.5**	**8.0**	**580**
8. Downstream of Mid-Rivers Mall		**9.3**	**9.2**	**4.2**	**0.24**	**0.22**	**0.50**	**498**	**232.0**		**22.6**	**7.8**	**227**
9. Mexico Road		**10.4**	**9.7**	**4.7**	**0.20**	**0.47**	**0.68**	**447**			**110.5**	**7.2**	**352**
*Median Value													
**Geometric Mean													

Water Quality Rating: Volunteer Water Quality Ratings were given at three sites, and a declining trend can be seen in a downstream direction. The Water Quality Rating at Hopewell Road in 2001 was 26, a score that indicates excellent water quality. The Water Quality Rating at Highway 40 in 2001 was 21, indicating relatively good water quality. Water Quality Ratings were given upstream of Mid-Rivers Mall in 1998 and 2001. In 1998, the score was 16, indicating fair water quality, but the Water Quality Rating at the same site in 2001 was 21, similar to the score at Highway 40. This Water Quality Rating is rather forgiving, and the limited amount of ratings makes it difficult to pinpoint a particular problem. In addition, there is no direct association with Water Quality Ratings and Missouri Water Quality Standards. Although this information does provide some insight, it cannot be used to place Dardenne Creek on the Missouri 303(d) list.

Temperature: Temperature (C°) readings appear to be variable and relatively unremarkable at all sites along Dardenne Creek. No temperature readings were available from the Hopewell Road site. There were no noted temperature Missouri Water Quality Criteria violations for high temperature levels or significant differences between sites.

Dissolved Oxygen: Dissolved oxygen (DO) levels were variable, but did not violate Water Quality Standards. Each site had one date with a low DO reading and five Water Quality Standard exceedances occurred on November 7, 1999. The cause of the low DO on this date is unknown. No dissolved oxygen readings were available from the Hopewell Road site. Although the data might suggest a dissolved oxygen impairment, the amount of data is minimal (eight or nine samples at each site). To be identified as an impairment, DO must fall below the standard of 5.0 mg/L in more than 10% of the samples. Dissolved oxygen levels require more study to draw a defensible conclusion regarding impairment.

Biological Oxygen Demand: High levels of Biological Oxygen Demand (BOD), a measure usually used to test for point source compliance, relate to low dissolved oxygen levels. Except for the Hopewell Road site, which was not tested for BOD, all of the sites were tested on 2 or 3 dates. None of the BOD levels were significantly high enough to suggest a problem.

Nutrients: All of the sites, except for the Hopewell Road site, were tested for nitrate (NO_3), ammonia (NH_3), and phosphate (PO_4). Except for a minor ammonia violation at Busch Conservation Area in November of 1998, none of these contaminants appeared to be significant.

Specific Conductance: Specific conductance is a measure of waste in streams. High salts, sulfates, and chlorides can lead to high specific conductance levels. Because it is variable and can be caused by a variety of substances, there is no Missouri Water Quality Standard for this parameter. Highway K was the site with the highest average specific conductance; however, this is not an indication of contamination.

Solids: Total solids (TS), total dissolved solids (TDS), and turbidity (TURB) are all good measures of erosion, runoff, and other problems associated with stormwater. There are no Missouri Water Quality Standards for these parameters. Most of the measurements for these parameters were taken at Hopewell Road and Highway K and sampled more sporadically at other sites. Impairment for solids is based on Missouri Water Quality narrative criteria that prohibit unsightly or harmful bottom deposits. There does appear to be a slight trend in a downstream direction for turbidity. Further study with a larger amount of data would be needed to draw a conclusion regarding impairment due to solids.

pH: No pH measurements were available for Hopewell Road, but three of the eight sites had one date with a pH violation – Henning Road, Highway K, and upstream of Mid-Rivers Mall. The violations at Henning Road and Highway K both occurred on the same date, December 5, 1999. The cause of the pH violations on this date is unknown. This data might suggest a pH impairment, but as with many of the other parameters, the amount of data is minimal (seven to nine samples at each site). Further investigation would be necessary to draw a defensible conclusion regarding impairment due to pH.

Fecal Coliform: There is a general trend of increasing Fecal Coliform (FC) levels in a downstream direction, the highest level being upstream of Mid-Rivers Mall. Like other parameters, fecal coliform was not tested at Hopewell Road. If the Missouri Water Quality Standard for fecal coliform applied to this stream, it would likely be considered impaired. Dardenne Creek is not currently designated for Whole Body Contact Recreation and consequently, the Missouri Water Quality Standard for fecal coliform does not apply to this stream.

For more information call or write:

Missouri Department of Natural Resources
Water Pollution Control Program
P.O. Box 176, Jefferson City, MO 65102-0176
1-800-361-4827 or (573) 751-1300 office
(573) 751-9396 fax
Program Home Page: www.dnr.state.mo.us/wpscd/wpcp/index.html